Palæozoic to the Mesozoic formation, appears to me to be hardly more credible; to say nothing of the indications of the existence of Dinosaurian forms in the Permian rocks, which have already been obtained.

For my part I entertain no sort of doubt that the reptiles, birds, and mammals of the Trias are the direct descendants of reptiles, birds, and mammals which existed in the latter part of the Palæozoic epoch, but not in any area of the present dry land which has yet been explored by the geologist.

This may seem a bold assumption, but it will not appear unwarrantable to those who reflect upon the very small extent of the earth surface which has hitherto exhibited the remains of the great Mammalian Fauna of the Eocene times. In this respect the Permian land vertebrate Fauna appears to me to be related to the Triassic, much as the Eocene is to the Miocene. Terrestrial reptiles have been found in Permian rocks only in three localities: in some spots of France and recently of England, and over a more extensive area in Germany. Who can suppose that the few fossils yet found in these regions give any sufficient representation of the Permian Fauna?

It may be said that the Carboniferous formations demonstrate the existence of a vast extent of dry land in the present dry land area; and that the supposed terrestrial Palæozoic vertebrate Fauna ought to have left its remains in the coal measures, especially as there is now reason to believe that much of the coal was formed on dry land. But if we consider the matter more closely, I think that this apparent objection loses its force. It is clear that during the Carboniferous epoch, the vast area of land which is now covered by coal measures must have been undergoing a gradual depression. The dry land thus depressed must, therefore, have existed, as such, before the Carboniferous epoch—in other words, the Devonian times—and its terrestrial population may never have been other than such as existed during the Devonian, or some previous epoch, although much higher forms may have been developed elsewhere.

Again, let me say that I am making no gratuitous assumption of inconceivable changes. It is clear that the enormous area of Polynesia is, on the whole, an area over which depression has taken place to an immense extent. Consequently a great continent, or assemblage of sub-continental masses of land, must have existed at some former time, and that at a recent period, geologically speaking, in the area of the Pacific. But if that continent had contained mammals, some of them must have remained to tell the tale; and as it is well known that these islands have no indigenous *Mammalia*, it is safe to assume that none existed. Thus, midway between Australia and South America, each of which possesses an abundant and diversified Mammalian Fauna, a mass of land, which may have been as large as both put together, must have existed without a Mammalian inhabitant. Suppose that the shores of this great land were fringed, as those of tropical Australia are now, with belts of mangroves which would extend landwards on the one side, and be buried beneath littoral deposits on the other side, as depression went on; and great beds of mangrove lignite might accumulate over the sinking land. Let upheaval of the whole now take place, in such a manner as to bring the newly emerging land into continuity with the South American, or Australian, continent; and, in course of time, it would be peopled by an extension of the Fauna of one of these two regions—just as I imagine the European Permian dry land to have been peopled.

I see nothing whatever against the supposition that distributional provinces of terrestrial life existed in the Devonian epoch, inasmuch as M. Barrande has proved that they existed much earlier. I am aware of no reason for doubting that, as regards the grades of terrestrial life contained in them, one of these may have been related to another as New Zealand is to Australia, or as Australia is to India, at present. Analogy seems to me to be rather in favour of, than against, the supposition that while only Ganoid fishes inhabited the fresh waters of our Devonian land, *Amphibia* and *Reptilia*, or even higher forms, may have existed, though we have not yet found them. The earliest Carboniferous *Amphibia* now known, such as *Anthracosaurus*, are so highly specialised, that I can by no means conceive that they have been developed out of piscine forms in the interval between the Devonian and the Carboniferous periods, considerable as that is. And I take refuge in one of two alternatives. Either they existed in our own area during the Devonian epoch and we have simply not yet found them; or, they formed part of the population of some other distributional province of that day; and only entered our area by migration, at the end of the Devonian epoch. Whether *Reptilia* and *Mammalia* existed along with them is to me, at present, a perfectly open question, which is just as likely to receive an affirmative, as a negative, answer from future inquirers.

Let me now gather together the threads of my argumentation into the form of a connected hypothetical view of the manner in which the distribution of living and extinct animals has been brought about.

I conceive that distinct provinces of the distribution of terrestrial life have existed since the earliest period at which that life is recorded, and, possibly, much earlier; and I suppose, with Mr. Darwin, that the progress of modification of terrestrial forms is more rapid in areas of elevation than in areas of depression. I take it to be certain that Labyrinthodont *Amphibia* existed in the distributional province which included the dry land depressed during the Carboniferous epoch: and I conceive that, in some other distributional provinces of that day, which remained in the condition of stationary, or of increasing dry land, the various types of the terrestrial *Sauropsida* and of the *Mammalia* were gradually developing.

The Permian epoch marks the commencement of a new movement of upheaval in our area, which attained its maximum in the Triassic epoch when dry land existed in North America, Europe, Asia, and Africa as it does now. Into this great new continental area the mammals, birds, and reptiles, developed during the Palæozoic epoch, spread, and formed the great Triassic Arctogæal province. But, at the end of the Triassic period, the movement of depression recommenced in our area, though it was doubtless balanced by elevation elsewhere; modification and development, checked in the one province, went on in that elsewhere; and the chief forms of mammals, birds, and reptiles, as we now know them, were evolved, and peopled the Mesozoic continent, from which I conceive Australia to have become separated as early as the end of the Triassic epoch, or not much later. This Mesozoic continent must, I conceive, have lain to the east, about the shores of the North Pacific and Indian Oceans; and I am inclined to believe that it continued along the eastern side of the Pacific area to what is now the province of Austro-Columbia, the characteristic Fauna of which is probably a remnant of the population of the latter part of this period.

Towards the latter part of the Mesozoic period, the movement of upheaval around the shores of the Atlantic once more recommenced, and was very probably accompanied by a depression around those of the Pacific. The Vertebrate Fauna elaborated in the Mesozoic continent, moved westward and took possession of the new lands which gradually increased in extent up to, and in some directions after, the Miocene epoch.

It is in favour of this hypothesis, I think, that it is consistent with the persistence of a general uniformity of the directions of the great masses of land and water. From the Devonian period, or earlier, to the present day, the four great oceans, Atlantic, Pacific, Arctic, and Antarctic, may have occupied their present positions, and only their coasts and channels of communication have undergone an incessant alteration. And, finally, the hypothesis I have put before you requires no supposition that the rate of change in organic life has been either greater, or less, in ancient times than it is now; nor any assumption, either physical or biological, which has not its justification in analogous phenomena of existing nature.

I have now only to discharge the last duty of my office, which is to thank you, not only for the patient attention with which you have listened to me so long to-day; but also for the uniform kindness with which, for the past two years, you have rendered my endeavours to perform the important, and often laborious, functions of your President, a pleasure, instead of a burden.

T. H. HUXLEY

SOCIETIES AND ACADEMIES

LONDON

Royal Society, Feb. 17.—The following papers were read: "Account of the Great Melbourne Telescope from April 1868, to its commencement of operations in Australia in 1869." By Albert le Sueur. The author stated that the building in which the telescope is placed is rectangular, 80 feet long meridionally by 25 wide, with walls 11 feet high. Of the meridional length, the telescope-room occupies the north 40 feet; the next 12 feet are appropriated to the polishing machine, crane, and engine; the remaining 28 feet are divided into two rooms, one of which is at present used as an office, the other, 25 by 14, is intended for a laboratory. The moveable roof is 40 feet long, and runs on rails laid the whole length of the walls; the telescope room may therefore be completely covered in, and as completely uncovered when required, the roof in the latter case resting on the south building, which on that account has a very low permanent roof. The telescope, when housed, lies meridionally on the east side of the pier, and nearly in a horizontal direction, provision having been made to prevent the tube being lowered beyond a certain small inclination. Some trouble was experienced in removing the varnish from the specula, and they would require repolishing. Of work done, the author could not yet speak with any satisfaction since it became at all practicable to use the telescope; the history which he had to relate was a long chapter of weary heart-breaking watchings, with an occasional half hour's work. η Argûs was the first object observed for purpose of delineation; after the first night's work little (and that by snatches) was done towards it; a new inroad of workmen and a long course of extremely unfavourable weather having carried the nebula out of convenient reach. The search, which was reluctantly given up, will, however, be again soon resumed. The horseshoe nebula is a grand object, conspicuous and with shape even in the finder. It appears, however, to present no marked difference (with perhaps one exception) which may not be accounted for by the difference of aperture used. This exception is the presence of a small but conspicuous double star at the s p angle of the knot which lies between the ȣ and the bright streak; the experiment has not been tried of cutting down the aperture to approximate to an 18-inch Herschelian, but the intrinsic brightness of the principal star, and the presence in the C G H of stars not more bright (No. 3 of Herschel's catalogue is certainly less bright) go far to show, without this experiment, that the star did not exist as such with its present brilliancy at the time of the C G H and P T 33 observations. The important position of the star, and the careful scrutiny which the knot and its neighbourhood must have repeatedly undergone, forbid the assumption that it was simply overlooked by Sir John Herschel. The star β is conspicuously and beautifully double, the companion of considerable brilliancy, about 15 mag.; with its present brilliancy and elongation, the author thinks, it should be within reach of an 18-inch. The appearance of the knot is sparkling, though no discrete stars can be seen, except perhaps a second faint one, which is suspected at the s f angle; part of the streak near to the knot is also sparkling, but not in so marked a manner; the other portions appear of the ordinary milky nebulosity. The fainter nebulosity (S) of the bright streak pretty well marks out the borders of the almost vacuous lane which leads up to and past the knot; on receding from the lane it becomes very faint; nor is this faintness uniform, but the appearances are so fugitive that, after repeated and painful effort, they could not be caught. The borders, however, stretching to the stars are occasionally pretty well seen. On one or two occasions the author suspected the existence of a link between the nebulosity about the star No. 10 and the lower portion of the ȣ; this, however, requires verification. At the f end, the upper and smaller semicircle is plainly marked, the lower and larger very faintly; its exact figure is, therefore, uncertain. 3570 is a small but beautiful spiral. The two brighter knots are resolvable. Of work out of the regular course, amongst other things, Neptune has been observed on some five or six occasions for figure and a second satellite, with only negative results. In the absence of a photographic apparatus to be used at the uninterrupted focus of large mirror, attempts have been made to utilise the second or Cassegrain image; an average exposure of near ten minutes on an eight-day moon produced pictures which (by no means good) were of sufficient promise to make it worth while to resume the attempt under more favourable conditions. The time of exposure is somewhat surprising, and would seem to indicate a great loss of chemical rays by a second perpendicular reflexion; but perhaps the inactivity was mainly due to absorption at the surface of the large mirror, which was then very yellow. The spectroscope arrived some time ago, but has not been much used; it is thought that for *star* work of any value some modification will be required, principally the exchange of the present collimator for one of longer focal length; a greater dispersion, moreover, seems desirable. The spectroscope was mainly designed for nebula work, is handy and compact, and will be of much service. For spectroscopic work on objects having a sensible diameter, the great telescope itself labours under some disadvantages; the enormous focal length and consequent magnification of the image is a serious inconvenience in the case of faint objects, and may be only partially remedied by a suitable condenser. This magnifying of the image may, however, in some cases be advantageous, from the possibility thereby afforded of viewing small definite portions of moderately bright objects, though unfortunately that will be seldom. Of nebulæ, Orion has been examined for purpose of practice; the three lines are plainly and conspicuously seen; the hydrogen line is comparatively much fainter than was anticipated, disappearing in the fainter portions of the nebula. 30 Doradûs shows the nitrogen line with facility, the second line certainly, but not in all positions, and always with difficulty; the hydrogen line is suspected only. No trace of a continuous spectrum could be seen. η Argûs has been observed on only one unfavourable morning; the nitrogen line was seen over a considerable space; the presence or absence of others, or of a continuous spectrum, could not be stated with certainty. With respect to future operations, it is intended that at first the routine work shall consist of a detailed delineation of the objects figured by Sir John Herschel, or any others which may prove interesting; this will take some time; for even without the impediment of cloudy weather, the delineation with any degree of satisfactory correctness, of a moderately large nebula, requires a considerable amount of work with careful and frequent scrutiny. It is hoped, however, that this work will by practice be found less painfully difficult than it is at present. The spectroscope will be used as much as possible, the moon photographed, and attempts made to photograph the nebulæ, when a photographic apparatus has beenpr ocured, and staging, photographic room, &c., added to the building. It is moreover hoped that before long a refractor, of some nine inches aperture, may be procured, to be mounted with the reflector, or, preferably, as a separate instrument. This telescope, besides being of much general use, will find much and valuable employment in determining micromctrically the chief points in the nebulæ under examination with the reflector, with more expedition and accuracy than at present; for spectroscopic work this telescope would be a valuable adjunct, especially if it be constructed of such comparatively short focal length as seems now to be practicable.

"On a distinct form of Transient Hemiopsia," by Hubert Airy. From a comparison of the different accounts of "Hemiopsia," "Half-vision," or "Half-blindness," by Wollaston, M. Arago, Brewster, the Astronomer Royal, Dufour, Sir John Herschel, Sir Charles Wheatstone, and Mr. Tyrrell, the author considers that, irrespective of the wide primary distinction between the transient and permanent forms of Hemiopsia, there are different forms of transient Hemiopsia which have all been included under the same name; Wollaston, Arago, Brewster, and Tyrrell, describing one form of the transient affection, while Sir John Herschel, Sir Charles Wheatstone, the Astronomer Royal, Professor Dufour, and the author agree in describing another. As to the actual seat of the visual derangement, the author considers that the exact agreement of the two eyes in the nature, extent, and degree of their affection, proves (assuming the semi-decussation of the optic nerves at the chiasma) the seat of the affection to be at some point behind the chiasma of these nerves. All the causes that are found to lead to transient half-blindness, point to the brain as the seat of disturbance. Still clearer is the evidence given by the loss of speech and of memory, the derangement of hearing, and the partial paralysis which sometimes follow an attack of teichopsia. Such cases as Sir John Herschel's, where the cloud passed over the whole field from left to right, can only be explained by supposing the disturbance to lie in some region of the brain where the opposite halves are in contact. The mischief may possibly be seated in the corpora quadrigemina or geniculata, or even in the cerebellum itself. The phenomena are so definite and so localised, and their course is so regular, that we can hardly avoid the conviction that their cause is equally definite and equally localised; and it is difficult to admit so vague an agent as nervous sympathy with gastric derangement, except as acting through the medium of some secondary local manifestation in the brain.

Chemical Society, February 17.—Prof. Williamson, F.R.S., president, in the chair. The following gentlemen were elected fellows:—R. T. Atcherley, T. W. Axe, A. H. Bateman, E. Francis, A. Prangley, W. Pritchard, L. B. Ross, T. G.

Rylands, T. Wills, and P. Wright. An account was given by Prof. Tyndall of his researches on "the action of light on gases and vapours," illustrated by a series of beautiful experiments. Dr. Tyndall began by remarking that it had, for the last ten years, been his endeavour to make radiant heat a means of getting an insight into the working of the atomic forces, or, in other words, into the state which is called chemical combination. Whilst pursuing his experiments with luminous waves on matter in a finely divided state, he was forced to imagine molecules and atoms; in fact, his belief in the existence of atoms is founded more upon those physical evidences than upon the considerations which are current in the chemical world. If he had to give up the notion of atoms, and to replace that conception by the abstract idea of multiple proportions, he would feel completely at a loss how to account for changes in the physical properties of matter. After these introductory remarks, the lecturer proceeded to the main subject. The apparatus which served to illustrate the statements, consisted of a glass tube about 3 feet in length, and 3 inches internal diameter, closed at each end by glass discs. This tube, after having been exhausted by an air-pump, was partially filled with dry air which had been permitted to bubble through the liquid whose vapours were to be examined. The condensed beam of an electric lamp was caused to pass through the tube from end to end. Since the aim of these experiments is to render visible the chemical action of light upon vapours, substances have been chosen, one at least of whose products of decomposion by light has so high a boiling point that as soon as it is formed it is precipitated. Nitrous oxide gas, the vapours of Alleylic Iodide, Amylic Nitrite, Benzole, &c., mixed with some air which had passed through hydric nitrate or hydric chloride, were found well suited for this purpose. In all cases, no matter what the nature of the vapours was, if it was only employed in a sufficiently attenuated state, the visible action commenced with the formation of a blue cloud, which in some instances was of the deepest azure tinge, rivalling the colour of the purest Italian sky. When a cell containing some of the liquid whose vapours are to be examined was inserted between the lamp and the tube, no clouds were formed within the tube; the luminous waves traversing the liquid had been deprived of their acting power. When polarised light was sent through the tube the blue cloud was visible only in one direction—the direction varying according to the position of the Nicol's prison; when the short diagonal of the Nicol was vertical, the blue cloud was seen when the specator's eye looked horizontally upon the tube, not otherwise; as soon as the prism was turned round its axis, the blue cloud was only seen when the line of vision fell vertically upon the experimental tube.

After concluding his account of this highly interesting subject, Prof. Tyndall showed some of the experiments bearing on his researches upon Dust, quite recently communicated at the Royal Institution.

Anthropological Society, February 15.—Dr. Berthold Seemann, V. P., in the chair. C. W. Eddy, Esq., M.A., and E. Schiemann, Esq., were elected Fellows. The following papers were read:—No. 1. "On the Aborigines of the Chatham Islands," by Dr. Barnard Davis and Mr. E. A. Welch. Mr. Welch, after discussing the history and discovery of those islands, described their conquest by the Maories and the ultimate fate of the Aborigines. Dr. Barnard Davis gave the results of a particular examination of the characters presented by the skulls and skeletons of many of the inhabitants. In three cases the cephalic indices of the skulls were stated to be ·74, ·74 and ·87. The stature of the Moriories, or Chatham Islanders, appeared to indicate a race shorter and stouter than the inhabitants of New Zealand. "On polygamy: its influence in determining the sex of our race and its effects on the growth of population." By Dr. J. Campbell. The author, who had been many years resident in Siam, gave minute details of the relative proportions of female to male births in the harems of the King and other important Siamese dignitaries. The result seemed to be that the proportions of males and females born were, as in the case of Monogamist marriages, entirely equal.—Mr. Ralph Tate described an inscribed rock on the banks of the Iguana, a tributary of the Orinoco. This presented an incised marking which the author considered to be more ancient than the present inhabitants of the district.

Royal Microscopical Society, February 9.—Annual meeting; the Rev. J. B. Reade, president, in the chair. The following gentlemen were elected officers for the ensuring year:—President, Rev. J. B. Reade; Vice-Presidents, Charles Brooke, L. S. Beale, James Glaisher, F. H. Wenham; Treasurer, Richard Mestayer; Secretaries, H. J. Slack, Jabez Hogg. The president read an address and announced his intention of presenting to the Society a copy of the Philosophical Transactions —60 vols. *in extenso*, from 1665 to 1812, and the parts from 1813 to the present time, as issued by the Royal Society.—Mrs. Holland presented the silver medal of the Society of Arts, with certificates awarded to her late husband for his "Microscopic Triplet," 1832. A micrometer ruled on silver by Mr. Barton, with some specimens of beads and bead lenses made by the late Mr. Holland, &c.—A vote of thanks was given to the president and Mrs. Holland for their presents.

Institution of Civil Engineers, February 1.—Mr. Charles B. Vignoles, F.R.S., president, in the chair. "On the statistics of railway expenditure and income, and their bearing on future railway policy and management." Mr. John Thornhill Harrison, M. Inst. C.E. From returns now made to the Board of Trade supplying definite information on most points of interest, the author had prepared a synopsis of this information for twenty of the principal railways in England and Scotland, representing about 85 per cent. of the entire capital expended in the United Kingdom. The original cost of railways, the working expenses, revenue, &c., were described, and it was shown that while the National Debt, amounting to 750 millions sterling, with a return of 26½ millions per annum, or 3½ per cent., was a burden on the industry and capital of the country, the capital expended on railways, amounting to 500 millions sterling, gave a return of 20 millions, or 4 per cent. per annum; whilst a sum nearly equal to the interest on the National Debt was annually expended in labour and materials.

PARIS

Academy of Sciences, February 14.—The greater part of the proceedings at this meeting had reference to subjects connected with mathematics and mechanics. M. de Saint-Venant presented a second part of his memoir on the determination of the pressure of incoherent soils upon walls; M. Morin an elaborate report upon a memoir by M. Tresca on the effects of punching and stamping, and on the mechanical theory of the deformation of solid bodies; M. de Saint-Venant appended to the latter a theoretical proof of the equality of the two coefficients of resistance to cutting with shears and to extension or compression in the continuous movement of deformation of ductile solids beyond the limits of their elasticity; and a report on five memoirs by M. F. Lucas, entitled investigations upon the mechanics of atoms.—M. C. Jordan communicated a paper on a new combination of the twenty-seven right lines of a surface of the third order; M. Pellet a note on the functions irreducible by means of one module, and one modular function, and M. A. Ribacour a note on the deformation of surfaces.—An extract from a letter of M. De la Rire to M. Jamin was read, referring to the observations of M. Trève on the action of magnetism upon rarefied gases.—M. Zaliwski read a note on a battery with three liquids regarded by him as superior to Bunsen's battery. The battery consists of an inner porous vessel, containing nitric acid and a plate of carbon, and an outer porous vessel containing sulphuric acid, the whole placed in a vessel containing a solution of hydroclorate of ammonia and a plate of zinc.—In a short note M. J. M. Séguin communicated some interesting observations on the accidental images of white objects.—M. A. Demoget described a new electro-magnetic apparatus, which, by an increase in the number of coils and alteration in their shape, can be made to produce a greater evolution of electricity, with less rapid revolution, than Siemens' apparatus.—M. P. Volpicelli communicated a paper containing an account of a photographic barometer, and some historical details upon lunar radiation. He noticed some modifications which he has introduced into the construction of a barometer for the Observatory at Rome, and with regard to the second subject, after citing several old writers, such as Aristotle, Thomas Aquinas, Pico della Mirandola, and Cardan as having admitted the production of calorific effects by the lunar radiation, maintains that the first experimental and incontestable demonstration of the phenomenon was given by Melloni in 1843.—A short note, illustrated with a figure, upon two solar spots now visible with the naked eye, by M. Tremeschini, was presented. The penumbras of these spots measure 0° 3′ 45″ and 0° 4′ 50″ in their greatest diameter; one of them contains a nucleus measuring 0° 0′ 45″11 in its greatest diameter.—M. J. Girard presented a note upon double crystals of snow, the formation of which he ascribes to the splitting of a drop of water too large to form a single crystal; the twin crystals are united by a small stay of a hexagonal prismatic form, having each of its edges corresponding exactly to the origin of one of the six regular branches of the two crystals.—A note by M. P. Bert on the influence of green light on the Sensitive plant, was presented by M. Claude Bernard. The author placed several young Sensitive plants in lanterns filled with variously coloured glass, and found that those exposed to green light lost their sensibility and died almost as quickly as those placed in perfect darkness.—M. A. Milne-Edwards communicated a note on some Mammalia from Eastern Thibet, which notwithstanding the rigour of the climate, is inhabited by two species of monkeys, a *Macacus* and a *Semnopithecus*.—The author noticed two forms of Insectivorous mammals forming new genera—one, which he calls *Nectogale elegans*, being intermediate between the Desmans and the Shrews; the other very nearly related to the latter, and called *Anourosorex* on account of the rudimentary state of its tail.—A singular animal, resembling a bear in general appearance, was noticed as forming a new genus, *Ailuropoda*, allied to the pandas and raccoons.—A long-snouted mole and a new flying squirrel were also mentioned.—The following notes and memoirs were communicated, but no particulars of their contents are given.—On the statistics of the therapeutical properties of the mineral waters of Barèges, Amélie-les-Bains, Vichy, and Bourbonne, by M. Champouillon; on some questions which may be referred to the theory of permanent isothermal lines, by M. E. Combescure; on staphyloraphie, and on the action of hydrate of chloral, by Mr. Lawson Tait; on the cause of the oscillatory movement of molecular granules by M. Lerique de Mouchy; on an accumulation of heat by the concentration of radiant heat through convex lenses of rock salt and the application of this heat to the production of a current of air giving rise to a continuous movement, by M. Vernier; on the production of the electric light by induction coils, by M. Delaurier; and a note on the trisection of the angle, by M. L. Vezzia.

BERLIN

German Chemical Society, February 14.—A. W. Hofmann gave a new instance of the aid science derives from industry. The manufacture of chloral yields as a secondary product chloride of ethyle mixed with other chlorinated liquids. By treating this mixture with alcoholic ammonia in Frankland's digester, large quantities of the chlorides of ethylated ammonia bases are formed, while sal-ammoniac separates. This appears now to be the most reasonable method for producing ethyl-amines. The chlorinated compounds mixed with the chloride of ethyl are not acted upon by NH_3. They remain behind. These liquids commence to boil at 30° C., and seem to consist partly of dichlorinated marsh gas.—O. Liebreich reported on Suewern's disinfecting process. The bulk of the substance employed consists of lime disguised by the presence of chloride of magnesium and tar. Its utility proved to be very limited. Amongst the details given by Mr. Liebreich he mentioned that the canal water operated upon contained nitrogenous matter in extremely variable quantities according to the temperature of the air. For 59 parts of N. found in it during warm days, it contained 2 parts only while the weather was cold.—V. Meyer described a new and ingenious synthetical method for producing organic acids. This method is founded on the observation that formiate of sodium, when heated, splits into H and the group COO Na. Thus, when heated alone, the formiate yields oxalate of sodium and H_2. When heated with the potassium salt of a sulpho-organic acid such as phenyl-sulphurous acid $HKSO_3$, acid sulphate of potassium separates and COO Na takes the place occupied by the group KSO_3. In the instance mentioned benzoate of sodium is formed. Sulphobenzoate of potassium similarly treated yields isophtalic acid. The same chemist made some interesting remarks on the constitution of camphor and of camphoric acid.—Mr. Franck, the discoverer of potassium salts in Stassfurth, and the originator of the important industry founded on this occurrence, gave some details of the manufacture of bromine from the mother liquors. After describing an apparatus for pouring bromine from one vessel to another, he described his process for purifying this substance by re-distillation. This he effects by allowing the vapour to pass through a solution of bromide of iron before it passes into the condenser. The chlorine mixed with the bromine is thus retained in the shape of chloride of iron. Bromide of iron is the best material for the production of potassium. It is also well suited for transport; and a large quantity of the bromine shipped to America, goes there in the form of dry bromide of iron. Parchment-paper and clay mixed with colza oil, serve to unite the vessels used in the distilling process of bromine. The retorts are made of sandstone, and are lined with tar inside. The bromine acts on the tar, entailing the inevitable loss of sixty or eighty pounds of bromine in a new retort, and the production of brominated organic products, boiling between 60° and 400° C., but containing no bromoform. The bromine manufactured at Stassfurth contains no trace of iodine.

DIARY

THURSDAY, FEBRUARY 24.

ROYAL SOCIETY, at 8.30.—Note on Certain Lichens: Dr. Stenhouse.—Successive Action of Sodium and Iodide of Ethyle upon Acetic Ether: Dr. Frankland and Mr. Duppa.
ZOOLOGICAL SOCIETY,
SOCIETY OF ANTIQUARIES, at 8.30.—On the Guilds at Wymondham, Norfolk: Mr. G. A. Carthew.
ROYAL INSTITUTION, at 3.—Chemistry: Prof. Odling.
LONDON INSTITUTION, at 7.30.

FRIDAY, FEBRUARY 25.

QUEKETT MICROSCOPICAL CLUB, at 8.
ROYAL INSTITUTION, at 9.—On the Results of the Ordnance Survey of Sinai: Captain Wilson.

SATURDAY, FEBRUARY 26.

ROYAL INSTITUTION, at 3.—Science of Religion: Prof. Max Müller.
ROYAL BOTANIC SOCIETY, at 3.45.

MONDAY, FEBRUARY 28.

GEOGRAPHICAL SOCIETY, at 8.30.
INSTITUE OF BRITISH ARCHITECTS, at 8.
INSTITUTE OF ACTUARIES, at 7.—On the Proper Method of Loading the Premiums required for the Grant of Life Annuities and Assurances: Mr. W. M. Makeham.
LONDON INSTITUTION, at 4.

TUESDAY, MARCH 1.

MEDICAL AND CHIRURGICAL SOCIETY, at 8.30.
ANTHROPOLOGICAL SOCIETY, at 8.—On the Circassian Slaves and the Sultan's Harem: Majoı F. Millingen.
INSTITUTION OF CIVIL ENGINEERS, at 8.—Discussion upon The Mhow-Ke-Mullee Viaduct, and The Pennair Bridge.—The Wolf Rock Lighthouse: Mr. J. N. Douglass.
SYRO-EGYPTIAN SOCIETY, at 7.30.
ROYAL INSTITUTION, at 3.—Plant Life: Dr. Masters.

WEDNESDAY, MARCH 2.

OBSTETRICAL SOCIETY, at 8.—Anniversary.
HORTICULTURAL SOCIETY, at 1.30.
SOCIETY OF ARTS, at 8.

THURSDAY, MARCH 3.

ROYAL INSTITUTION, at 3.—Chemistry: Prof. Odling.
ROYAL SOCIETY, at
LINNEAN SOCIETY, at 8.—On Hybridism among Cinchonæ: Mr. J. Broughton.

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ERRATA.—Page 409, first column sixth line: for "Fern Deal," read "Ferndene."—Page 410, first column, fourth line: for "29," read "19."—Page 410, second column, fortieth line: for "50," read "40."—Page 406, second column, twenty-fourth line: for "x," read "φ."

Professor Jevons requests us to state that the subject of the paper read by him at the Manchester Philosophical Society, though similar to that read at the Royal Society, was not the same as was inadvertently stated in our report at p. 393.